

REMARKS

Request for continued examination:

Applicants acknowledge the Examiner's acceptance of the request for continued examination under 37 CFR 1.114.

35 USC § 102:

In item 4 of the Office Action, Claims 1-7, 9-10 and 14-15 are rejected under 35 USC 102(e) as being anticipated by Lundgard (US 6,174,427). Claim 1 has been amended. Claims 10 and 14 have been canceled making the objection to these claims moot.

Applicants contend that claim 1, as amended, is not anticipated by Lundgard. Amended claim 1 of the present invention, discloses the limitation of polyoxymethylene (e.g. polyacetals) material which is not disclosed by Lundgard. In contrast Lundgard refers to thermoset (427, column 2, line 29) polyesters. Thus, Lundgard is not an anticipating reference for the present invention of amended claim 1. The amendment to claim 1, is not new matter as the polyoxymethylene is disclosed in claim 11 and on page 1, lines 35-39 of the specification.

Claims 2-7 and 9 are dependent from amended claim 1 and thus for the above reason are not anticipated by Lundgard. Thus, claims 1-7 and 9 are believed to be in allowable condition. Reconsideration and allowance of these claims is respectfully requested.

35 USC § 103(a):

I.

In item 6 of the Office Action, Claim 8 is rejected under 35 USC 103(a) as being unpatentable over Lundgard. Applicants respectfully disagree.

Applicants' invention, discloses the use of polyoxymethylene, in amended claim 1, as the polymer matrix which is not disclosed in Lundgard as discussed above. Lundgard refers to polyesters that are thermoset in contrast to polyoxymethylene, which is not a thermoset material.

Thus, claim 8, which is dependent from claim 4, which is dependent from amended claim 1, is believed to be in allowable condition as it depends from a presumed allowable claim for the reasons stated above. Reconsideration and allowance of this claim is respectfully requested.

II.

In item 7 of the Office Action, the Examiner rejects claim 13 under 35 USC §103(a) claim as being unpatentable over Lundgard in view of FP 639613. Claim 13 has been canceled making the rejection to this claim moot.

III.

In item 8 of the Office Action, the Examiner rejects claims 1-10 and 13-15 under 35 USC §103(a) as being unpatentable over Noguchi et al. (US 5,281,379) in view of Moss (US 4,698,372) and Sekutowski (US 4,740,538). Applicants respectfully contend that the combination of these references would not have made the present invention obvious. Claims 10, 13, and 14 have been canceled making the rejections to these claims moot.

Noguchi does not disclose the use of polyoxymethylene as in the present invention. By the Examiner's admission, Noguchi et al further does not disclose the "(a) aspect ratio of calcium carbonate filler and (b) [the] amount of stearic acid" (page 6, paragraph 2 of the office action dated November 12, 2002). Additionally, neither Moss nor Sekutowski which is "drawn to polyamide or polyester composition" (page 6, paragraph 4 of the 11/12/02 Office Action) disclose the use of a polyoxymethylene composition. Additionally, the films produced in Moss are extremely soft, satiny and textile like. Moss puts fillers and organic acids into already soft, flexible polymers, and makes them even softer and more flexible. This is in contrast to Applicants' invention in which the POM is made stiffer by the addition of fillers and organic acids.

Furthermore, as stated on page 4 line 24 - 26 of the instant application, it is known in the art (reference 1993 publication entitled Toughened Plastics I) that the fracture mechanics of polyacetals differs considerably from that of polyamides. This difference is also present between polyacetals and polyesters. Polyacetals are quite unusual in regard to fracture behavior. Thus, any teaching with regard to the fracture behaviour of other polymers does not apply to polyacetals. Thus, it would not have been obvious to one of ordinary skill in the art to combine these cited references to create a polyoxymethylene composition of the present invention.

Furthermore, assuming the cited art were combined they would not yield the present invention as the cited art does not disclose the use of polyoxymethylene in the composition or article from the composition.

For the above stated reasons and in light of the dependency of the remaining claims on amended claim 1, claims 1-9 and 15 are believed to be in allowable condition. Reconsideration and allowance of these claims are respectfully requested.

IV.

In item 9, Claims 11-12 are rejected by the Examiner under 35 USC§ 103(a) as being unpatentable over Noguchi et al. in view of Moss and Sekutowski as applied to claims 1-10 and 13-15 above, and further in view of Imahashi (US 6, 043,306). Applicants respectfully disagree. Claims 11 and 12 have been canceled but new claims 31-32 have been added. New claim 31 is supported (and is thus not new matter) by now canceled claim 12. New claim 32 is supported by the specification on page 6, line14-15 and thus not new matter. In light of new claim 31 being based on canceled claim 12, the following response is provided. The arguments made in section III above are reiterated here regarding Noguchi, Moss and Sekutowski. Hence, for the above stated reasons, (the cited art does not disclose the use of polyacetal as in the present invention) the present invention is not believed obvious. In light of the Moss

Imahashi is directed to flame retardants, and cites numerous polymers in which the claimed flame retardants are believed to be effective. Thus, Imahashi is directed to the flammability or combustion properties of polymers and additives for the modification of those properties. In contrast, Applicants' invention is directed to the mechanical failure mode of high modulus polyacetals, that is the fracture behavior of POM, and to additives for modifying that fracture behavior. The Examiner, by asserting that the polybutylene terephthalate of Noguchi et al is interchangeable with the polyacetal disclosed in Imahashi, suggests that if two polymers exhibit similar combustion properties, then they will exhibit similar fracture behavior. Applicants assert that the two phenomena are unrelated to each other, and that one of skill in the art would not conclude from Imahashi that polyacetals and polybutylene terephthalate exhibit similar fracture mechanics. Hence, Applicants contend that Imahashi has no bearing on the instant invention.

Furthermore, Applicants contend that even if there was any suggestion in Imahashi that these are interchangeable, one of skill in the art would fully appreciate that polyacetal and polybutylene terephthalate are not interchangeable relative to flame retardation. The reason being that acetal is extremely flammable and burns completely with a hot blue flame and without leaving any char whereas polyesters form char and are relatively easy to flame retard.

For the above stated reasons and in light of the dependency of the remaining claims on amended claim 1, claims 11 and 12 are believed to be in allowable condition. Reconsideration and allowance of these claims are respectfully requested.

V.

In item 10, claims 1-8, 10 and 14-15 are rejected under 35 USC § 103(a) as being unpatentable over Charles et al. (US. 4, 157,325) in view of Wallace (US 5,502,099). Applicants disagree. Claims 10 and 14 have been canceled making the rejection to these claims moot.

Applicants have amended claim 1, to limit it to polyacetal which contrasts with Charles that is directed to polybutylene terephthalate. Furthermore Wallace is directed to flexible compositions (col 1, line 32) such as polyolefins, not polyacetals of the present invention. Thus, one of ordinary skill in the art would not likely combine these cited arts to form the present invention. And, assuming these cited references where combined they do not disclose the use of the polyacetal of the present invention.

For the above stated reasons and in light of the dependency of the remaining claims on amended claim 1, claims 1-8 and 15 are believed to be in allowable condition. Reconsideration and allowance of these claims are respectfully requested.

VI.

In item 11, claims 11-12 are rejected under 35 USC § 103(a) as being unpatentable over Charles et al. in view of Wallace as applied to claims 1-8, 10 and 14-15 above, and further in view of Imahashi (US 6,043,306). Claims 11 and 12 have been canceled but new claims 31-32 have been added. New claim 31 is supported (and is thus not new matter) by now canceled claim 12, hence the following response is provided.

See the above arguments relative to the inapplicability of Imahashi to the present invention. The remaining references cited by Examiner are directed to polymers other than polyacetals. As stated on page 4 line 24 of the instant application, it is known in the art that the fracture mechanics of polyacetals differs considerably from that of polyamides. It also differs from that of polyesters. Polyacetals are quite unusual in regard to fracture behavior, both in impact fracture mechanism and even in the nature of their stress-strain curves under the slower and more gentle conditions of standard tensile tests. Thus any teaching with regard to the fracture behaviour of other polymers does not apply to polyacetals. For the above stated reasons and in light of the dependency of the remaining claims on amended claim 1, claims 1-8 and 15 are believed to be in allowable condition. Reconsideration and allowance of these claims are respectfully requested.

VIII.

In item 12, Claim 13 is rejected under 35 USC § 103(a) as being unpatentable over Charles Et al. in view of Wallace as applied to claims 1-8, 10 and 14-15 above, and further in view of EP 639613. Claim 13 has been canceled making the rejection to this claim moot.

IX.

In view of the foregoing, the present invention is believed to be in allowable condition. Reconsideration and allowance of claims 1-9, 31 and 32 and the above-referenced application is respectfully requested.

X.

Applicants note the Examiners response to Applicants' prior arguments and provide the above arguments in response.

Extension:

A petition under 37 CFR § 1.136 for a two-month extension of time to respond to the Examiner's action is enclosed, the fee should be charged to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company.) If, any additional fee is due in order to obtain consideration of this response, please charge that fee to the above identified account.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In showing the changes, deleted material is shown as bracketed, and inserted material is shown underlined.

IN THE CLAIMS:

1. (three times amended): A composition comprising (a) [an engineering polymer having a backbone comprising repeat units at least 80 mol-% of which repeat units comprise on or more oxygen or nitrogen atoms disposed in said backbone] a polymer comprising at least 80 mol-% of oxymethylene repeat units; (b) about 1%-30% by volume of a mineral filler having an aspect ratio of 5 or less, the filler having an average equivalent spherical diameter in the range of about 0.1 to less than about 3.5 micrometers; and (c) a saturated organic acid, salt thereof, or a mixture thereof, at a concentration of at least about 0.5% by weight of the mineral filler.

Cancel Claims 10, 11, 12, 13, and 14.

Claim 31 (new) The composition of Claim 1 comprising up to 10 mol-% of oxyalkylene repeat units having adjacent methylene groups.

Claim 32 (new) The composition of Claim 32 wherein said oxyalkylene repeat unit is ethylene oxide.

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